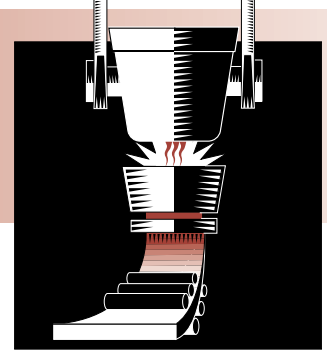


# STEEL

## Project Fact Sheet



### RECYCLING AND REUSE OF BASIC OXYGEN FURNACE (BOF)/BASIC OXYGEN PROCESS (BOP) STEELMAKING SLAGS

#### BENEFITS

- Iron recovered from BOF slag saves 10 million British thermal units (Btu) per ton of new steel
- Recovery contributes to higher percentage of iron units being converted to steel
- Use of slag component for AMD neutralization applications in abandoned coal mines
- Minimize the potential of alkalinity run-off at mill sites

#### APPLICATIONS

With technologies and methodologies developed through this project, steelmaking slag may be processed to produce products that will ultimately allow for the conservation of energy, generate revenues for the domestic steel industry, and reduce landfill use.

### NEW TECHNOLOGIES AND METHODOLOGIES MAY ALLOW VALUE-ADDED UTILIZATION OF STEELMAKING SLAG THUS REDUCING WASTE AND USE OF LANDFILLS, AND SAVING ENERGY

The U.S. steel industry generates about 30 million tons of by-products each year, including six million tons of BOF/BOP slag. The recycling of blast furnace (BF) slag has made significant progress in past years with much of the material being utilized as construction aggregate and in cementitious applications. However, the recycling of BOF/BOP slag still faces many technical, economical, and environmental challenges. Previous efforts have focused on in-plant recycling of the by-products, achieving limited success. As a result, large amounts of by-products of various qualities have been stockpiled at steel mills or disposed into landfills.

Michigan Technological University (MTU) is developing an integrated system of technologies to recover the iron value from BOF steelmaking slag and to divert the residual non-iron bearing fraction into a feedstock for the manufacture of acid mine drainage (AMD) neutralizing agent. In this project, technologies are being developed to separate iron from the BOF slag and prepare those iron units for furnace charge. The residue will be evaluated by the National Mine Land Reclamation Center (NMLRC) at West Virginia University as an AMD neutralization material. The use of this material would save lime, which is currently the material of choice.

#### PHOTOGRAPH OF STOCKPILES



Typical stockpiles of steel slags.



## Recycling and Reuse of Basic Oxygen Furnace (BOF)/Basic Oxygen Process (BOP) in Steelmaking Slags (Continued)

Based on previous research conducted by MTU, it is believed that steelmaking slag can be processed into high-iron and non-iron fractions. Based on previous research conducted by West Virginia University, it is believed that the steel industry has a great potential to sell the non-iron fraction of steelmaking slag as an AMD neutralization agent. Overall, the logistics, economics, and energy savings look extremely favorable for these technologies and application.

### Project Description

**Goal:** To develop technologies that will result in the beneficial use of BOF slag.

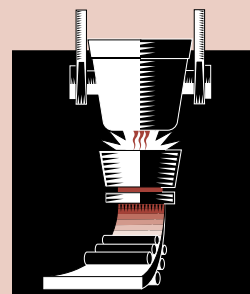
The scope of this four-year project is three-fold. First, MTU researchers seek to increase the efficiency of iron unit recovery from BOF/BOP slag. Second, the project calls for the development of value-added feedstocks for steel mill furnaces that will generate energy savings to the integrated iron and steel industry. Third, West Virginia University-National Mine Land Reclamation Center (WVU-NMLRC) researchers will evaluate the use of non-iron bearing materials in AMD direct treatment technology for the creation of a large volume material utilization program with the mining sector to mutually reduce environmental liabilities.

### Progress and Milestones

- Project Start Date, July 2002.
- Sample Collection, August 2002.
- Material Characterization/Project Analytical, August 2002.
- Bench Scale Testing, October 2002.
- Pilot Plant Testing, January 2004.
- Demonstration Plant Testing, January 2005.
- Project End Date, July 2006.

### Commercialization Plans

The overall commercialization strategy is to develop with the project partners an integrated BOF/BOP slag and AMD treatment network around the Ohio River and its tributary waterways that reach into the Appalachian Coal Basin.



#### PROJECT PARTNERS

Michigan Technological University  
Houghton, MI  
(Principal Investigator)

Ferrous Environmental Recycling  
Corporation (FERCO)  
Dearborn, MI

Ispat Inland Inc.  
East Chicago, IN

The International Metals Reclamation  
Company, Inc. (INMETCO)  
Ellwood City, PA

United States Steel Corporation  
Pittsburgh, PA

Veltec  
Coraopolis, PA

West Virginia University, National Mine  
Land Reclamation Center (WVU-NMLRC)  
Morgantown, WV

#### FOR ADDITIONAL INFORMATION, PLEASE CONTACT:

Simon Friedrich  
Office of Industrial Technologies  
Phone: (202) 586-6759  
Fax: (202) 586-7114  
simon.friedrich@ee.doe.gov  
<http://www.oit.doe.gov/steel>

Please send any comments,  
questions, or suggestions to  
[webmaster.oit@ee.doe.gov](mailto:webmaster.oit@ee.doe.gov).  
Visit our home page at  
[www.oit.doe.gov](http://www.oit.doe.gov).

Office of Industrial Technologies  
Energy Efficiency  
and Renewable Energy  
U.S. Department of Energy  
Washington, D.C. 20585



January 2002